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ANALYSING FLEXIBILITY AND INTEGRATION NEEDS IN BUDGETING IS TECHNOLOGIES

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Abstract

The duality characteristics of budgeting between the flexibility driven decision making and the integration focused management control inspire the author to investigate how the flexibility and integration domains influence business controllers' choices of IS technologies used in budgeting. This includes the enterprise resource planning (ERP) system, business intelligent (BI), web tool and spreadsheets. Guided by the concept of human agency, twenty business controllers in eleven companies in Thailand are interviewed. The analysis shows that flexibility and integration in budgeting IS technologies can be viewed from four domains: organisation-in-focus, personal requirement, business requirement and reporting requirement. The analysis also shows that there are conflicts between these four domains based on the needs for flexibility and integration. It is found that spreadsheets are used when flexibility is needed especially for decision making at local unit level. However advanced IS technologies like the ERP system, BI and web tool, are employed for relatively stable management control tasks. The major implication is that business controllers apply budgeting IS technologies to fit the nature of the budgeting tasks at hand. Therefore there is clearly a need to employ a variety of IS technologies, and not to dominate any particular IS technologies for budgeting because each system is designed for its own respective purposes and intentions.

Keywords: Budgeting, Decision making, Management control, ERP system

1 Introduction

Granlund (2011) states that current accounting information system (AIS) research should focus more on management control and decision making issues in connection to modern IS technologies. This is in agreement with Jones and Karsten (2008) who feel that modern IS technologies like the enterprise resource planning (ERP) system may restrict users in business processes. Inspired by this the present paper aims to react to these two previous research gaps by investigating management control and decision making in a budgeting context with a view to identifying how they enable and/or restrict business controller choices of IS technologies used.

Budgeting, as one of the oldest yet most popular accounting controls (Libby and Lindsay, 2010), is defined as a *process* undertaken to achieve a quantitative statement for a defined period of time (Covaleski et al., 2006). A review of Simons' levers of control¹ (1994) suggests that budgets can be used either *diagnostically* for management control purposes in order "to monitor organisational outcomes and correct deviations from pre-set standards" and/or *interactively* for decision making so that managers "regularly and personally involve themselves in the decision activities of subordinates". Traditional budgeting literature often associates budgeting with management control (Otley and Berry, 1980). Nonetheless recent literature has indicated that increasing numbers of organisations are turning to budgeting as a decision making tool through an adoption of *better budgeting* practices (Neely et al., 2003) such as rolling forecast, due to rapid technology changes (Abernethy and Brownell, 1999), local contingencies (Chenhall, 2003), and intense competition (Frow et al., 2010). The author builds on Simons and postulates that it is up to top management to determine how these control mechanisms should be combined; therefore it is deemed that budgeting incorporates both management control and decision making roles in varying combinations.

The dual roles of budgeting require the process to be more flexible, in response to local contingencies and intense competitions, yet more integrative for efficient monitoring (Chapman and Kihn, 2009). The flexibility driven decision making calls for a participative budgeting approach in order to collect diverse information, such as hard financial and soft intellectual information sources, for budget constructing at unit levels. On the contrary, the management control foundation calls for a company-wide integrative performance measurement mechanism, therefore department-specific budgets must be integrated into one solid organisational plan so that the management can verify goal congruence (Arwidi and Samuelson, 1993), whilst also monitoring and identifying performances.

Consistent with Granlund (2011) and Scapens and Jazayeri (2003), it is claimed that prior research on how IS technologies are used in management control, decision making and budgeting is limited. Previous research particularly concentrates on the ERP system, and claims that the ERP system changes the role of management accountants from *bean counters* to *business partners*. They spend more time and skills on information analysis due to improved relevant and real time information access provided by the system (Caglio, 2003 ; Grabski et al., 2008). Research has suggested that the ERP system as such does not have any direct impact on the financial or non-financial performance of organisations. Indeed the impacts are shown only when the ERP system is used to mediate proper management control techniques (Chapman and Kihn, 2009 ; Kallunki et al., 2011). Therefore, the ERP system adoption per se neither promotes an adoption of the advanced management accounting technique (Booth et al., 2000) nor changes the nature of budgeting ex-post (Granlund and Malmi, 2002

¹ The levers of controls is used in line with previous interpretations in budgeting research, namely Abernethy, M. A. and Brownell, P. (1999). The role of budgets in organizations facing strategic change: an exploratory study, *Accounting, Organizations and Society*, 24 (3), 189-204. Therefore the author omits the two remaining control systems -boundary system and belief system- since they are not related to budgeting.

; Hyvönen, 2003). In a study where the ERP system and BI are compared (Rom and Rohde, 2006), BI seems to have a slightly better support for budgeting than the ERP system. However the supports for budgeting from both systems are still non-significant. This results in spreadsheets being used as the primary tool in budgeting processes (Uppatumwichian et al., 2011) in both multinational and local organisations despite the existence of ERP and BI applications. None of the aforementioned reports have provided an explanation as to why advanced IS technologies such as ERP and BI cannot defeat simple spreadsheets in budgeting processes. In the quest to unpack ERP's and BI's moderate impacts on budgeting, the author is convinced that it is crucial to uncover the nature of budgeting per se in relation to IS technologies. The author believes that budgeting portrays a brilliant social context under which to investigate the complex entanglement among management control, decision making and IS technologies in response to the research gaps addressed above.

Having identified the nature of budgeting, the author dwells here on budgeting as a social conduct and turn to the human agency concept in Anthony Giddens' structuration theory (See Section 2) to interpret how business controllers (human agents) may understand control mechanisms embedded in budgeting through their choices of IS technologies such as ERP, BI and spreadsheets. Therefore the research question addressed in this paper is: how can the needs for flexibility and integration in budgeting IS technologies be explained?

This paper proceeds as follows. In the next section, the concept of human agency from Anthony Giddens' Structuration theory is introduced. Section 3 discusses an interpretative case study method and describes the eleven case companies selected for this study. Section 4 provides vivid examples from the case companies and analysis on the flexibility and integration needs in IS technologies used in budgeting. Section 5, the final section, discusses research conclusions and implications.

2 Human agency

This paper employs structuration theory as a background to the analysis as the author focuses particularly on the human agency concept embedded in the theory. It is claimed that Giddens favours this approach over a vain application of the structuration theory in its entirety because it allows more detailed and meaningful exploration of a problem at hand (Sharma et al., 2012). Following Giddens' advice (Giddens, 1984, p.326), the concept of human agency is applied in this study as a *sensitising device* for data analysis rather than a prescribed guideline for data collection and analysis.

The structuration theory places emphasis on a process whereby human agents and society interact and create social structure. However, Giddens' view of human agency is strongly voluntaristic (Jones and Karsten, 2008) compared to the society. Giddens argues that except in cases where human agents have been dragged and mishandled by others, they always "*have the possibility to do otherwise*" (Giddens, 1979, p.258). In other words, human agents have an ability to interpret how particular social structures enable or constrain them to achieve certain actions; consequently they attempt to work around these enabling and constraining powers, which might unintentionally generate change in the social structure.

Many writers have questioned whether or not social structures (be it physically or, as Giddens puts it, out of time and space) simply constrain human agents since there are many circumstances in which agents are 'forced' to pursue only one feasible option (Bhaskar, 1979 ; Callinicos, 1985). In addition, Archer (1982) further comments that the 'could-have-done-otherwise' human agency concept is problematic because it implies that human agents do not have to adhere to social structures in the structuration. In response to his critics, Giddens argues that everything else other than the human agency contributes to a form of determinism forcing those subject to it which implies his determination on the power that social structures have on human agents.

The author employs the concept of human agency in connection to previous works on IS (See for example: Boudreau and Robey, 2005 ; DeSanctis and Poole, 1994 ; Orlikowski, 1992). Especially from Orlikowski who is clearly influenced by Giddens' human agency as she conceptualises material

artefacts as “the outcome of coordinated human action and hence inherently social” being “created and changed by human action”.

Budgeting is deemed to entail the flexibility and integrative requirements previously discussed. Through the interviews with business controllers (human agents), the author seeks to describe the needs for flexibility and integration in budgeting IS technologies and how these needs are interpreted in their choices of IS technologies employed. The next section discusses the research method and the case organisations involved in this study.

3 Research Method and Case Descriptions

This paper adopts an interpretative case study method (Walsham, 1995) based on the mutually dependent ensemble view (Orlikowski and Iacono, 2001) towards technology and social in line with the human agency concept rooted in structuration theory. Eleven for-profit companies from Thailand are included in this study based on the following criteria: (1) company which has installed and used ERP system for accounting and finance function for more than two years to ensure system maturity, (2) company which is listed on a stock exchange market to ensure proper internal control compliance and size consistency, (3) company which has used budgeting as the main accounting control.

The data for the study are collected from many primary and secondary sources including face-to-face interviews with twenty participants in the eleven companies, internal documentation, annual reports, and company websites. The author conducts semi-structured interviews which last for an hour on average. All interviews are recorded, transcribed and analysed using Nvivo8 qualitative analysis software. The inductive coding technique (Miles and Huberman, 1994, p.61) is adopted to guide the analysis. Coding is performed in two iterative steps; first an open-ended general epic coding followed by a more specific emic coding in order to allow a maximum interwoven within the data analysis. Interview participants are primarily middle managers, responsible for budgeting in the companies such as CFO, accounting vice president, planning vice president, accounting policy vice president, financial analyst and IT manager. The choice to predominantly select middle managers is informed by established academic arguments on how these middle managers influence strategic and operational practices in organisations (Rouleau, 2005 ; Westley, 1990).

No.	Case	Industry	Main activities	Owner	ERP	Spreadsheets	BI	Web
1	A	Energy	Power plant	Thai	SAP	Yes	Magnitude	-
2	B	Energy	Oil and Petrochemical	Thai	SAP	Yes	Cognos	-
3	C	Energy	Oil refinery	Thai	SAP	Yes	-	-
4	D	Food	Frozen food processor	Thai	SAP	Yes	-	-
5	E	Food	Drinks and dairy products	Foreign	SAP	Yes	Magnitude	-
6	F	Food	Drinks	Foreign	SAP	Yes	-	Yes
7	G	Food	Agricultural products	Thai	BPCS	Yes	-	-
8	H	Automobile	Truck	Foreign	SAP	Yes	-	-
9	I	Automobile	Automobile parts	Thai	SAP	Yes	-	Yes
10	J	Electronics	Electronic appliances	Foreign	JDE	Yes	-	Yes
11	K	Hospitality	Hotels and apartments	Thai	Oracle	Yes	IDeaS	-

Table 1. Case company descriptions

The companies studied are located in Thailand; however they participate directly in the Global economies since they export goods and render services outside the country. Companies in the energy industry (Cases A, B and C) are the back bone of the Thai energy production chain which serves Thailand and the Asia Pacific region. Their activities include offshore oil drillings, oil refinery, petrochemical productions, power plants and gas stations. Companies in the food industry produce many internationally recognised food products. Cases E and F are Southeast Asian units of global food companies, while cases D and G are Thai-based food original equipment manufacturers (OEM) which supply products on a global scale. The remaining four cases (Case H, I, J and K) represent diverse

industries, yet they are core functions of the country's economy. Case H is a Thai business unit of a worldwide automobile brand. Case I is a Thai OEM of automobile parts for many known personal car manufacturers. Case J is an international electronic organisation which specialises in household appliances. Case K, a division of a Thailand-based hospitality conglomerate, operates many five-star hotels, resorts and serviced apartments both domestically and internationally. Table 1 summarises company profiles and IS technologies used as they relate to the budgeting process.

All organisations have ERP systems and spreadsheets for budgeting but some have additional IS technologies such as BI and web tool. Cases B and K use Cognos and IDeaS BI applications for business forecasting. Case A is using the Magnitude BI to assist budgeting but is also configuring SAP ERP for cash flow budgeting. Case E is another case which uses Magnitude BI for budgeting; however the company is assessing the possibility of implementing a web tool on a global scale. Case G has experienced a failed Cognos BI implementation. Cases F, I and J have access to internally developed budgeting web-based applications, which are used to report their preformatted budgets and actual operating results to headquarters. Although some organisations, especially foreign-owned companies, may not have the full authority toward their IT policies, the author is convinced that they have enough control over their IT procedures as they can raise issues to their respective foreign headquarters.

4 Empirical data and analysis

This section disaggregates the empirical data and analysis into two sections. The author begins by analysing how business controllers, through IS technology use, interpret the needs for flexibility in budgeting IS technologies. The author then continues discussing the same matter with the integration of budgeting. The inductive coding and data analysis suggests that flexibility and integration can be considered from the following four dimensions: organisation-in-focus, personal requirement, business requirement and reporting requirement.

4.1 Analysing the needs for flexibility

The bottom up budgeting technique, adopted in response to rapid rates of technological advancement, intense competition, and market vitality, requires budgeting processes to differ from one individual unit to another due to environmental variations, specific company characters and prioritised objectives (Abernethy and Brownell, 1999). To improve decision quality and reduce uncertainty inherent in complex decision making, businesses often employ various assumptions from diverse sources corresponding to individual unit requirements as the Planning Vice President in Case B describes: “to construct a revenue budget, we look into assumptions such as GDP, field oil prices, Dubai oil prices and exchange rate. These things also vary from business unit to business unit. We have a special team working on these assumptions because they determine our revenue budget, hence our ability to predict sales peaks and bottoms”. The term flexibility used here refers to business controllers' discretions over the use of a budgeting system for decision making which gains its momentum from advanced IS technologies (Ahrens and Chapman, 2004). Spreadsheets and BI are famous examples of IS technologies which allow ad-hoc customisation of routine budgeting information, while the ERP system constantly enforces routines reporting for different recipients. Through the use of these IS technologies in budgeting, the author attempts to interpret what flexibility might mean to business controllers.

Organisation in focus – budgeting is constructed to reflect actual operation which might be different from legal entities used for financial statement preparation. With this in mind business controllers must therefore make certain adjustments for operational purposes as the Financial Planning Manager in case F explains: “planning is more complicated than the normal accounting procedure. Accounting department closes their books based on their legal entities, don't they? Let's say it is the legal entity for Thailand, so they close the book and pay taxes. Anyhow we have certain departments that do not work entirely for the Thailand legal entity like legal and IT departments, for planning purpose I must exclude them [using spreadsheets despite the existence of web tool]”. Intricate separation between

legal and operational entities has also caused Cognos BI implementation failure resulting in a sole reliance on spreadsheets for budgeting, as the Central Accounting Executive describes in Case G comments: “I never see how Cognos would work for us except in that case that we had one simple legal entity separated into departments. But we are a group of companies; we have many legal entities and many business lines. On occasion we have the same legal entity working on two separated business lines”. It is indicated that for planning and decision making purposes, business controllers need to separate an operational view from an ordinary legal entity view using IS technologies, that is, spreadsheets which are most suitable for them.

Personal requirements – personal requirements and preferences characterise the use of IS technologies in budgeting, especially spreadsheets, as the CFO in case H exemplifies: “Excel [spreadsheets] are built based on a person’s experiences and preferences. Like when my selling and administrative (S&A) controller left the company, the new controller must learn how the old guy created formulas and links. It was a lot of work which lasted for a couple months. But in the end, he just gave up and created a new Excel sheet because he was not used to it. He was not familiar with the old formulas and patterns. It was just easier for him to create a new sheet”. In case G, the author has observed that a personal work requirement fuelled with championship plays a significant role in shaping flexibility beyond technology capabilities as the Senior Costing Manager in Case G points out: “Cognos [BI] can be used for simple budgeting. I mean if you want to get an income statement and a cash flow statement. Fine, that is very easy to do. You can also put in simple assumptions and turn them around but I think our Senior Management Accounting Manager [who is primarily responsible for budgeting] wants ‘*too much*’ out of it. That is why it did not work”. It has been demonstrated that business controllers approach budgeting from diverse requirements beyond a capacity that any advanced IS technologies can offer; therefore they prefer to use spreadsheets because the technology allows them to exercise their personal discretions in budgeting.

Business requirements – Subunit business requirements and needs for locally unique information dictate how budgeting should be carried out at unit level. Business controllers often design the processes to reflect their business nature but often IS technologies which enforce routine reporting stand in their way. The Accounting Policy Vice President in case B indicates: “our businesses move very fast. We have non-oil businesses like coffee shop and space rental under one service station. SAP [ERP] does not have any function that will support these extra activities that we have. For a service station, we want to report all business activities that happen. We want to drill down to see how much we are making from petrol, coffee shop and space rental for example. They all should be treated as segments under that service station but it is very complicated to design this into SAP [ERP]”. Ever-changing business environments and strategic compliance obligate budgeting practices to change accordingly but it is not always efficient to alter these requirements in the ERP system as the Head of Accounting in case A points out: “budgeting is not fixed like [financial] accounting. If we plan that we will acquire six more companies next year then we have to change SAP [ERP] codes, but we can do this very quickly on spreadsheets”. Even in the case that an IS technology is specifically designed and developed for company-specific budgeting practice, it represents incompatibility issues with company-owned business requirements. The Financial Planning Manager in case F, who has access to a home-grown budgeting web tool, indicates: “we must share our revenues with our business partners according to certain specific agreements, which it is not an easy round number. Our web tool cannot support this revenue sharing requirement so we encourage our regional companies to continue using Excel [spreadsheets]”.

Reporting requirements – reporting represents a very important aspect of decision making because it allows decision makers to check on progress and resource utilisation, detect problems and decide corrective actions. Therefore business controllers need to look for information from numerous dimensions, namely sales by customers, products and gross margin, based on their personal needs for information processing. Indeed, as the Financial Planning Manager in case F indicates: “my boss is rather creative, he always asks for new dimensions of information”. Spreadsheets are often the IS technology that business controllers turn to in order to generate reports because it is more practical,

flexible and faster as the Accounting Policy Vice President in Case B which has access to both ERP and BI technologies suggests: “top management’s requirements come and go very fast. So we extract data from the SAP and do it on Excel spreadsheets instead. [Apart from that], SAP [ERP] cannot generate reports that we want. The system might have one report that we need but it does not have the other nine reports that we also need”. This statement is supported by another indication from the CFO in case H who confirms that she “hardly uses any reports coming out of SAP [ERP]” because they do not meet her simple reporting requirements. She further explains: “if I look at the actual results from SAP [ERP], it does not mean a thing to me. I need to compare the actual results with budget numbers but we do not have those on [SAP] R/3 [ERP]. After that I need to see variances, you know this kind of thing makes it hard to use any [SAP] R/3 [ERP] report”.

At present, the analysis shows that business controllers need flexibility for decision making in budgeting. They focus on an operational view of organisation and allow their own individual approach to dominate budgeting practice in response to unique local business and reporting requirements they receive from top management. The next section proceeds to analyse the integration in budgeting using the same dimensions.

4.2 Analysing the needs for integration

The elementary function of management control, which is to compare performances against pre-determined standards and plans, calls for complete information integration across data sources. The term integration refers to standardisation of data definitions and structures using common conceptual schema across a collection of data sources with the assistance of IS technologies (Goodhue et al., 1992). The ERP system, which exists in all case companies, is supposed to bridge information from diverse data sources. However, it seems to be of little assistance due to an incompatible design which fails to integrate the business and the system. This is evident when business controllers use Excel spreadsheets for many budgeting processes, namely budget consolidation and variance analysis, because the integrated ERP system is not compatible with work processes (Granlund and Malmi, 2002). The most advanced use of the ERP system for data integration purpose is present in cases A and B where the ERP system is used for budget spending control in connection with procurement and accounting functions. The Planning Vice President in Case B explains: “from a workflow perspective, we link budgeting with purchasing. When we buy something, we indicate that it is bought for this budget line and this is the money we have got. Then we reserve the amount in SAP [ERP] so next time we know that this is the money we have left. When the transaction is completed, we use this information for general ledger recording”. This section attempts to interpret what the needs for integration might mean to business controllers in budgeting work.

Organisation in focus—The bureaucratic multi-divisional organisation structure calls for integrated information through existing IS technologies for financial monitoring. Although this work is supposed to be achieved through the ERP system, empirical evidence suggests the opposite as the CFO in case J expresses: “all companies [legal entities] in the Southeast Asia region use JDE [ERP] but they are not interconnected so we use the web tool to report data instead”. In every case where a web tool is present (Cases F, I and J), it is used solely for budget and/or actual data submission in compliance with group reporting policy, therefore it does not allow any complicated data manipulation needed for analysis. The remaining cases, including case B which seems to have the most advanced integrated IS from an integration of budgeting data on both ERP and BI, perform a partial budget consolidation on Excel spreadsheets. The Planning Vice President in case B explains: “the issue is that some of our affiliated companies [legal entities] are not yet ready for Cognos. So now we use Cognos for consolidation if we can. For those that are not ready, we get Excel sheets from them instead. Then we combine Cognos with Excel in order to get a consolidated statement for the entire group”. This indicates that at the organisational level, the multi-divisional organisation focuses on integrated information based on a legal entity for business monitoring purposes. Many IS technologies are used for budget information integration, that is, web tool and BI with the assistance of spreadsheets. The

ERP system, an integrated IS technology, is supposed to facilitate budget consolidation but the empirical evidence suggests otherwise.

Personal requirements– Common conceptual schema information is fundamental to management control because it allows business controllers to track performance against pre-set standards. IS technology enables common data definition across local units, therefore it works against personal data definitions and requirements (Chapman and Kihn, 2009). Indeed, the Business Intelligent Manager in Case K expresses: “a consequence after the central database implementation is standardisation. Properties used to report whatever they wanted to because it did not affect anyone else, now they have to conform to a reporting standard”. The positive impacts of a collective work approach, which relies on common data definition based on integrated IS technologies, are time discipline and information accuracy. First the Vice President of Information Technology in case I explains how a web tool can improve time discipline through discretionary reduction among business units: “the issue was that business units did not submit budgets on time so we implemented a web tool [instead of spreadsheets]. Through a web tool, we can announce that we allow them to upload budgets until this day, and then we will close the system. It imposes time discipline on them”. Second the Planning Vice President in Case B further mentions that information accuracy benefits from using integrated IS technologies: “when working with spreadsheets, there is no way to verify that the information is correct. When we use Cognos [BI], it is a whole new story. Now it is a system practice”. From this the author deduces that the collective-work approach and IS technology alignment are not only essential to budget data integration but also generate many positive impacts to organisations as a whole.

Business requirements –The multi-divisional organisations establish enterprise-wide business requirements and performance goals for subunits which need to be monitored closely. In Case B, budgeting information is integrated from the BI to the ERP system for control purposes since the ERP system gives an easy and up-to-date comparison between actual spending versus budgets (Caglio, 2003). Integrative advanced IS technologies help business controllers to monitor subunit performance as the Business Intelligent Manager in Case K discusses: “after we have implemented the BI and a central database depository, it is easier to work. Like when I want to plan a brand promotion, I do not have to call properties up anymore. I just log on to the system and see the trend”. Despite this she acknowledges that a lack of fully integrated budgeting information on one single IS depository is a hindrance as she further suggests: “since the actual performance is on Oracle but the budget is not on there, somehow I feel that there is a lack of synchronisation between performance and budgets”. The results shown in this section are consistent with Chapman and Kihn (2009) who conclude that IS integration enables control.

Reporting requirements–External financial statement reporting standards like Generally Accepted Accounting Principle (GAAP) or International Financial Reporting Standards (IFRS) may have an impact on budgeting especially for listed companies because a management team must make performance commitments to a board of directors and shareholders based on a complied financial statement format. Integrated IS technologies reassure that business controllers conform to financial statement reporting standards. The Financial Analyst in Case B observes: “using Cognos is better for budget consolidation. Cognos follows GAAP but you can never be sure with Excel. I can track eliminations of intercompany transactions in Cognos which is not always possible to do in Excel”. A similar reason is evident in case A where IFRS compliance is the major drive behind their ERP system upgrade as the Treasurer comments: “we decide to upgrade to SAP ECC 6.0 because of IFRS². It will come in effect this year so we set the timeline that the upgrade had to finish before the year started”.

²The Federation of Accounting Professions (Thailand) plans to align the existing Thai Accounting Standards (TAS) with IFRS effective from 2011 onwards commencing with Thailand’s fifty largest listed companies. (Source: www.fap.or.th)

The analysis demonstrates the need for budgeting integration in management control by monitoring legal business entity through a collective approach in response to enterprise-wide and external reporting requirements. The author now presents the analysis conclusion with regards to flexibility and integration domains in budgeting as well as any possible future research.

5 Conclusions and contributions

It can be concluded that budgeting works clearly combine the flexibility in decision making and the integration in management control elements into the process. This statement is in line with the suggestion from Simons (1994) that it is up to the management to make their own decisions in specific contexts on how these control mechanisms should be combined. Through the concept of human agency building on the flexibility and integration use of budgeting, the author further analyses how business controllers interpret the entanglement of budgeting IS technologies, namely the ERP system, BI, spreadsheets and web tool, in connection to the flexibility and integration conditions. The analysis shows that business controllers perceive flexibility and integration from the four dimensions: organisation-in-focus, personal requirements, business requirements and reporting requirements. Table 2 summarises the findings based on the analysis of the empirical data from the eleven cases.

Dimensions	Flexibility	Integration
Organisation-in-focus	Operational basis entity	Legal basis entity
Personal requirements	Individual requirements	Collective requirements
Business requirements	Local business requirements	Enterprise-wide business requirements
Reporting requirements	Individual reporting compliance	External reporting standard compliance

Table 2. Contradictions between flexibility and integration in budgeting

The first organisation-in-focus dimension demonstrates that there is a struggle between the operational and legal entity view of organisations. It is clear that both views are needed in a budgeting process, however, for contradictory purposes. The operational view assists local decision making, dissimilar to the legal view for monitoring and control. This means that spreadsheets are often called upon to assist data manipulation based on the operational view while advanced IS technologies like web tools and BI are often used for supporting budget consolidation according to the legal view. An interesting finding is that despite the existence of the ERP system in all case companies, none of the case companies use ERP for budget consolidation.

Regarding the personal requirements dimension, the author displays a contradiction between individual and collective requirements. Business controllers at local level often require distinctive information, structured around one's personal requirements, preference and experiences, to support decision making. Once again the findings show that spreadsheets are the main IS tool used to tailor data according to one's requirements because it is not possible to retrieve this unique from advanced IS technologies like the ERP system, BI and web tool. Indeed these technologies are designed and operated according to the collective requirements for data gathering across organisational units.

From the analysis of the business requirement dimension, it can be stated that it represents an incongruity between local business requirements and enterprise-wide business requirements. Business controllers comment that advanced IS technologies, especially the ERP system and web tool restrict them to comply with local requirements. In order to react to the restrictions imposed, business controllers maintain their own separated spreadsheets suitable for business nature. On the contrary, they acknowledge the importance of integrative advanced IS technologies, configured according to enterprise-wide business requirements, especially when they need to monitor and collect information from various data sources for strategic planning.

The analysis of the reporting requirement dimension portrays a conflict between internally driven reporting requirements against externally accepted accounting standards. The internally driven reporting requirement is tailored to fit specific, unpredictable and fast-changing situations, directly

affected by external environments. Spreadsheets are once more employed to assist these unstructured reports due to cost and time efficiency. However advanced IS technologies, particularly the ERP system and BI, are employed to support structured reports, namely GAAP complied budgets, presented for public audience.

The major implication from this analysis is that in general business controllers must apply budgeting IS technologies to fit the nature of budgeting tasks. When budgeting is used for unstructured decision making, namely preparing budgeting to conform to operational purpose and management reporting, business controllers should employ IS technology which allows maximum discretion over data manipulation. This could certainly be seen as one reason for why business controllers use spreadsheets. The rational view of decision making requires a complex data model (on an IS technology) to formulate all the essential dimensions of the environments as well as to determine and evaluate the best possible alternatives before a decision can be made. To employ advanced IS technologies like ERP, BI or web tool for the daunting task of decision making could be seen as inappropriate because these systems are not primarily designed to support any unstructured data model needed for decision making. On the contrary, it could be recommended for business controllers to employ advanced IS technologies, especially the ERP system and BI, for other management control processes, namely monitoring of actual performance in relation to budgets and preparation of GAAP compiled financial statements for budgets. These activities are characterised with certainties which can be directly translated into IS technologies as the author has discussed an IFRS-ready ERP system. These advanced IS technologies are deemed to be the most effective with regards to management control functions. In addition, it is recommend an integration of budgeting information between these advanced IS technologies, that is, a complete integration between ERP and BI and/or web tool, to ensure data monitoring efficiency and information accuracy.

Having analysed the needs for flexibility and integration in budgeting IS technologies using the concept of human agency in ST, the author concurs with Granlund and Malmi (2002), Rom and Rhode (2006), and Hyvönen (2003) that the ERP system and BI applications have a moderate impact on budgeting practice. Indeed it has been shown that business controllers (the human agencies) only choose to employ these technologies when they are applicable to management control functions. Specifically, budgeting practice does not change according to these advanced IS technologies. Building on previous research, the internally-developed web tool appears to have a similar moderate impact on budgeting, which is indifferent from the ERP system and BI. The main conclusion thus far is that the needs for flexibility and integration in budgeting influence to a high extent which IS technologies are used. From the business controllers' perspective they often choose to use spreadsheets since they see this software as fulfilling their needs for flexibility. Future research could well investigate whether budgeting should be led by any of these advanced IS technologies, ERP or BI? Although it is not possible to say that budgeting practices employed in the case organisations under study are flawless, the author does not think that budgeting, including any other business practices, should be driven by any kind of IS technologies. Businesses would be in a very dangerous position if the ERP system, for example, is used for local decision making since the system is not designed to collect local data and/or present data in such a way that is useful for local decision making. The same applies to BI application which receives a moderate preference over the ERP system in academic research (See for example: Rom and Rohde, 2006). The author questions the validity of the comparison approach because these systems are designed for completely different purposes. Therefore they should not be compared for any reason. Indeed, the author proposes that it is more appropriate to employ a contingency approach to determine the circumstances which deliberately reinforce and weaken ERP and BI use in budgeting or other accounting control activities. Industrial research (Sallam, 2011 ; Trifkovic and Gower, 2007) has advanced academic research with regards to this point. They have already criticised the BI system for having a weak interoperability and integration with the existing ERP system as well as complications in system design. These lead them to conclude why users do not prefer using BI for more complicated analytical works as it should be.

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